CENTRAL INTELLIGENCE AGENCY

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SUBJECT Research on Preservation of Foods and Biologically Useful Foods

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THIS IS UNEVALUATED INFORMATION

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1. Scientific and research activity was almost at a standstill during the occupation of Czechoslovakia, and since that time there has not been sufficient contact with scientists outside the country to make up for this inactivity. Not only is there a shortage of foreign technical literature in Czechoslovakia, but there is little knowledge of foreign production techniques. For these reasons many of the production methods of the chemical industry are behind those used by the chemical industries of Western Europe.

2. The only known instance of technical information which the USSR contributed to Czechoslovakia prior to February 1948 consisted of a process for a water-soluble resin for industrial uses, which had been developed by the Moscow Experimental Plastics Plant (MEZP). The formula involved a phenolformaldehyde condensate with dicyanodiamide, to be prepared in two phases in an alkaline medium.

Drying of Foods

3. One of the most urgent problems under consideration by the Ministry of Food was preservation of foods for military purposes. The method of preservation by drying was of particular importance to the military authorities because dried foods effected the following:

a. Saving of containers (there was a shortage of tin cans).

b. Saving in volume and weight and in storage space.

c. Simplification of transportation.

d. Keeping of foods indefinitely without spoilage.

e. Rapid preparation of foods.

These dried foods were wanted as reserves for field kitchens and principally during a mobile war, and the army was therefore especially interested in using domestic agricultural products in order to ensure sufficient supplies if the situation became serious and to retain as much food value as possible.

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4. Thus, at the beginning of April 1948, the Ministry of Food issued directives on food preservation to the various research groups, which were requested to collect the findings on their own research and to help formulate problems in this research that required solution. These problems were to be presented by the end of April 1948 and actual research was to be concluded by May 1949.

5. The period required for drying foods is not nearly as important as the drying temperatures used. The principal process for drying vegetables maintains a temperature of between 50° and 80° C, and the final drying between 30° and 70° C. New drying methods of undetermined value are:

a. Cylinder drying under high heat.

b. Cylinder drying with freezing.

c. Drying by powdering.

d. Vacuum drying with mild heat.

e. Drying by means of hygroscopic substances at normal temperatures.

The last two methods produce dried foods of a quality approaching that of fresh foods, but their cost, particularly that of the vacuum process, makes them less useful in the drying of large quantities of ordinary foods.

6. The loss of vitamin C in the process of drying foods is the most serious problem. Some foods, such as spinach, lose as much as 50 percent of their vitamin C when they are stored in a warm place, and up to 90 percent when dried.

7. Pressing of dried foods is a technique important to the military, but this process also encounters difficulties. The pressures used must not be so high as to break the food into too small particles.

8. During the first half of 1949, it was decided to locate the principal food drying plant in Slovakia, and the Slovak nationalized food industry was to make the first production tests.

Supplemental Domestic Foods

9. A program to obtain biologically useful foods from domestic sources to supplement the national diet was introduced at the beginning of 1948. The aim was to ensure a healthful diet for the people at all times, particularly during the period before the harvest when fresh vegetables were not obtainable. It was also desired to reduce the imports of fresh vegetables and tropical fruits.

10. The following courses were under consideration for the fulfilling of such a program:

a. The establishment of large greenhouse farms for growing early vegetables. These were to be located in the Elbe region and in the nonindustrialized regions of southern Bohemia.

b. The development of food preservation techniques which would preserve vitamins and other components.

c. The obtaining of new sources of vitamins and like components from domestic substances.

11. For the third method, the possibility of sprouting the seeds of various plants, and the utilization of skimmed milk and whey, were studied, and in October 1948 a report on this research was furnished the Ministry of Food. This report contained information on the production of important dietetic substances during the sprouting of seeds: minerals, carbohydrates particularly those easily resorbed, phytosterins, phosphatides, lecithines, ferments, secretins, auxins, and vitamins; and it proposed a method involving nutrient solutions for the more rapid sprouting of seeds. It would be possible thereby to shorten the process, which usually took from seven to ten days, to 24 hours, and the valuable dietetic elements would have less time to escape or be decomposed. To achieve this new germination method, the following steps were to be taken:

a. The conditions necessary for the accelerated germination of various types of seeds were to be investigated, including the effects of various nutrient mineral salts, moisture, temperature, sunlight, and aeration.

b. The changes in substances throughout the germination process were to be studied and optimum conditions determined.

c. All valuable dietetic substances were to be converted into stable forms, capable of the broadest possible use.

12. In order to establish optimum germination conditions, it was decided to investigate the production of soluble nitrogen compounds, the degree of hydrolization of starch and, on the express request of the Ministry of Food, the vitamin content. Ing. Josef Tovara and Ing. Anna Hladikova from the Chemical Institute of Prague were assigned to this project, primarily to carry out analytical work. Various techniques were adopted for determining the presence of vitamins A, B_1, B_2, C, and D. Tovara and Hladikova were to test the usefulness of these analytical methods and by May 1949 to develop methods for removing harmful agents in the process. First practical tests were conducted in the fall of 1948 in the private bakery of one Manet. Dry baked goods were prepared from wheat flour which had been made from grain whose germination had been accelerated by nutrient solutions.

13. Before the war the skimmed milk remaining after butter production had been generally used as fodder. Now it was proposed to process this milk in order to produce a nondenatured, reversible milk albumin precipitated by means of pectins. Whey had also formerly been used as fodder, and efforts were being made at this time to secure vitamin B from whey since it is a rich source of that material. The chromatographic method, with various clays as adsorbents, was used. This work had been done earlier with vegetable materials. Diabetes mellitus was favorably treated with both whey lactoflavin and vegetable glucokinins by means of subcutaneous injections and per os, and no hypoglycemia had been experienced.

Personnel at Chemical Institute

14. The following persons were engaged in research work at the Cehmical Institute:

a. Dr. Richard Adamek. He discovered a new antibiotic and was continuing in this work.

b. Dr. Josef Fidler. He assisted in the work on antibiotics; he was principally interested in their application in the food industry, such as in retarding the souring of milk.

c. Dr. Frantisek Fink. He worked on organotherapeutics, primarily in processing liver wastes. He began the work of isolating cholesterol from the spinal area.

d. Dr. Karel Hrdlicka. He was to do work on the preservation of butter. He was also to determine the basis of the so-called Hansen biological extract and introduce its production into nationalized dairies.

e. Ing. Ludvik Zuckriegel. His project was to test and compare chemical and oligodynamic means for maintaining the purity of drinking water.

f. Ing. Josef Tovara and Ing. Anna Hladikova.

g. Dr. Karel Vsetecka. He studied certain substances derived from poisonous mushrooms in order to develop pharmaceuticals.

h. Dr. Josef Dvorak. He was attached to the technical division of the institute, and his job was to work out quick analytical methods for determining certain additives in gasoline fuels.